

FÓRMULAS TRIGONOMÉTRICAS

Suma y diferencia de ángulos

$$\begin{array}{l|l} \begin{array}{l} \operatorname{sen}(\alpha + \beta) = \operatorname{sen} \alpha \cdot \cos \beta + \cos \alpha \cdot \operatorname{sen} \beta \\ \cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \operatorname{sen} \alpha \cdot \operatorname{sen} \beta \\ \operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg} \alpha + \operatorname{tg} \beta}{1 - \operatorname{tg} \alpha \cdot \operatorname{tg} \beta} \end{array} & \begin{array}{l} \operatorname{sen}(\alpha - \beta) = \operatorname{sen} \alpha \cdot \cos \beta - \cos \alpha \cdot \operatorname{sen} \beta \\ \cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \operatorname{sen} \alpha \cdot \operatorname{sen} \beta \\ \operatorname{tg}(\alpha - \beta) = \frac{\operatorname{tg} \alpha - \operatorname{tg} \beta}{1 + \operatorname{tg} \alpha \cdot \operatorname{tg} \beta} \end{array} \end{array}$$

Ángulo doble

$$\operatorname{sen} 2\alpha = 2 \cdot \operatorname{sen} \alpha \cdot \cos \alpha$$

$$\cos 2\alpha = \cos^2 \alpha - \operatorname{sen}^2 \alpha$$

$$\operatorname{tg} 2\alpha = \frac{2 \operatorname{tg} \alpha}{1 - \operatorname{tg}^2 \alpha}$$

Ángulo mitad

$$\operatorname{sen} \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}}$$

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

$$\tan \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{1 + \cos \alpha}}$$

Sumas y diferencias de senos y cosenos

$$\left\{ \begin{array}{l} \operatorname{sen} A + \operatorname{sen} B = 2 \operatorname{sen} \frac{A+B}{2} \cos \frac{A-B}{2} \\ \operatorname{sen} A - \operatorname{sen} B = 2 \cos \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2} \\ \cos A + \cos B = 2 \cos \frac{A+B}{2} \cos \frac{A-B}{2} \\ \cos A - \cos B = -2 \operatorname{sen} \frac{A+B}{2} \operatorname{sen} \frac{A-B}{2} \end{array} \right.$$